

What is claimed is:

- 1 1. A method of fabricating a contact pad of a semiconductor device, the
2 method comprising:
3 (a) forming a gate structure including a gate upper dielectric layer on a
4 semiconductor substrate;
5 (b) forming a stopping layer over the semiconductor substrate;
6 (c) forming an interdielectric layer over the stopping layer;
7 (d) planarizing the interdielectric layer to expose at least the gate upper
8 dielectric layer using a material which exhibits a high-polishing selectivity with
9 respect to the interdielectric layer;
10 (e) etching the interdielectric layer in a region in which a contact pad will be
11 formed on the semiconductor substrate;
12 (f) depositing a conductive material for the contact pad on the semiconductor
13 substrate; and
14 (g) planarizing using a material which exhibits a high-polishing selectivity of
15 the gate upper dielectric layer with respect to the conductive material.
- 1 2. The method of claim 1, wherein the gate upper dielectric layer is one
2 selected from the group consisting essentially of a nitride layer (SiN) and a
3 aluminum oxide layer (Al₂O₃).
- 1 3. The method of claim 1, wherein the thickness of the gate upper

2 dielectric layer is in the range of approximately 1500 Å and 2500 Å.

1 4. The method of claim 1, wherein the stopping layer is a nitride layer
2 (SiN).

1 5. The method of claim 1, wherein the thickness of the stopping layer is in
2 the range of approximately 50 Å and 150 Å.

1 6. The method of claim 1, wherein the interdielectric layer is dielectric
2 layer selected from the group consisting of a polymer, a HDP oxide layer, a PE-
3 TEOS layer, a USG layer, a BPSG layer, a PSG layer, a FOX layer, and a
4 photoresist layer.

1 7. The method of claim 1, wherein a process for planarizing the
2 interdielectric layer is further performed after the depositing of the interdielectric
3 layer.

1 8. The method of claim 1, wherein planarizing of (d) is
2 performed using a process chosen from the group consisting essentially of CMP and
3 dry etching.

1 9. The method of claim 8, wherein the CMP is performed using a slurry

2 which exhibits a polishing selectivity of the gate upper dielectric layer with respect to
3 the interdielectric layer in the range of approximately 1:5 to approximately 1:50.

1 10. The method of claim 9, wherein the slurry includes abrasive particle
2 selected from the group consisting essentially of alumina, silica, ceria, and Mn_2O_3 .

1 11. The method of claim 1, wherein an etch buffering layer is formed
2 on the entire surface of the planarized semiconductor substrate is further performed
3 after (d).

1 12. The method of claim 11, wherein an anti-reflective layer is formed
2 on the semiconductor substrate on which the etch buffering layer is formed.

1 13. The method of claim 11, wherein the etch buffering layer is formed
2 of the same material as the conductive material.

1 14. The method of claim 11, wherein the thickness of the etch buffering
2 layer is in the range of approximately 500 Å and 1500 Å.

1 15. The method of claim 12, wherein the anti-reflective layer includes
2 amorphous carbon layer.

1 16. The method of claim 1, wherein an exposed portion of the
2 stopping layer is etched after (e).

1 17. The method of claim 1, wherein the conductive material for the contact
2 pad is one chosen from the group consisting of polysilicon, titanium (Ti), nitride
3 titanium (TiN), and tungsten (W).

1 18. The method of claim 1, wherein planarizing of (g) is performed
2 a process chosen from the group consisting essentially of dry etching and CMP.

1 19. The method of claim 18, wherein the CMP process is performed using
2 a slurry which exhibits a polishing selectivity of the gate upper dielectric layer with
3 respect to the conductive material in the range of approximately 1:5 to approximately
4 1:50.

1 20. The method of claim 19, wherein the slurry includes abrasive particles
2 selected from the group consisting essentially of alumina, silica, ceria, and Mn_2O_3 .